

INTERSTATE COMMISSION ON THE POTOMAC RIVER BASIN

FY2016-2017 SECTION 106

POTOMAC BASIN WATER QUALITY IMPROVEMENT

WORKPLAN AND PROGRESS REPORT

March 29, 2016

This is an ongoing program. The nature of the scope of work for the use or generation of environmental data is similar to work completed in previous grants and has an approved QMP. The accomplished tasks • support development of TMDLs, • enhance water quality restoration and protection on a watershed basis, • improve drinking water source area protections, • help develop and maintain adequate monitoring and assessment measures, and • foster greater involvement of informed citizens.

GRANT COORDINATOR

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**Goal:** (2) Clean and Safe Water**Objective:** (2.2) Protect Water Quality**Program Result Code:** 202B06**Work Plan Component:** Water Quality Assessment**EPA Contact:** Leo Essenthier**ICPRB Contact:** Claire Buchanan (301) 274-8112**Program Description:** ICPRB initiates, participates in, and contributes to inter-agency and inter-disciplinary initiatives that protect and enhance the waters and related resources of the Potomac River basin.

<u>Environmental Outcomes</u>	<u>Measures</u>	<u>Outputs (Work Products and Activities)</u>	<u>Status / Comment</u>
Enhanced interstate management for water quality restoration and protection	Grant management Adherence to ICPRB QMP Participation in & contributions to inter-agency initiatives	<p><i>FY16-17 Outputs:</i></p> <ol style="list-style-type: none"> Grant management <ul style="list-style-type: none"> Quarterly progress reports to the ICPRB Commission and semi-annual progress reports to EPA3 with description of specific activities and their contributions to the states' water quality protection efforts. EPA Form 5700-52A, MBE/WBE Report, for FY2015 (Oct 31, 2015). Financial Status Report for FY2015 (December 31, 2015). Application for the FY2017 Section 106 grant (July 31, 2016). QAPPs and updated QMP (when necessary) Inter-agency initiatives <p><i>FY16-17 Activities:</i></p> <ol style="list-style-type: none"> Manage this grant, including implementation of QA/QC as required by ICPRB Quality Management Plan Participate in and contribute to inter-agency water quality initiatives: <ul style="list-style-type: none"> EPA Region III Water Directors meetings and Chesapeake Bay Program (CBP) workgroups and goal implementation teams Interstate Council on Water Policy(ICWP) and Association of Clean Water Administrators (ACWA) Maryland Water Monitoring Council (MWMC), Association of Mid-Atlantic Aquatic Biologists (AMAAB) Anacostia Watershed Restoration Alliance, Anacostia Restoration Potential Workgroup, Anacostia Watershed Citizen's Advisory Council, and Anacostia Watershed Management Committee, Trash Free Potomac Watershed Initiative Adams County (PA) Water Resources Advisory Committee (WRAC) Virginia James River Study Science Advisory Panel Inter-agency and/or watershed-based groups focused on water quality problems 	<ol style="list-style-type: none"> Prepared quarterly progress reports to the ICPRB commission; submitted EPA Form 5700-52A and MBE/WBE Report for FY2015; submitted financial status report for FY2015 Staff participated in and contributed to inter-agency water quality initiatives. Some products include: <ul style="list-style-type: none"> Chesapeake Bay Program workgroups and GITs James River Chlorophyll <i>a</i> Criteria Study – presentation & white paper to the Study's Scientific Advisory Panel, report (ICP16-1 Buchanan) to EPA3 MWMC presentation AMAAB presentation EPA3 Training Workshop (Rehoboth, DE) presentation about recent ICPRB filamentous green algae monitoring efforts Virginia Volunteer Monitoring Conference presentation ICWP presentation Anacostia Watershed Citizen Advisory Committee, Anacostia Watershed Restoration Management Committee Potomac Watershed Roundtable

Goal: (2) Clean and Safe Water	Objective: (2.2) Protect Water Quality	Program Result Code: 202B06
Work Plan Component: Water Quality Assessment	EPA Contact: Leo Essenthier	ICPRB Contact: Heidi Moltz, (301) 274-8116
Program Description: ICPRB participates in, contributes to, and provides technical assistance to efforts that promote integrated water resources management in the Potomac River basin and the United States. The Commission encourages development of a Potomac Basin-Wide Comprehensive Water Resources Plan, and assembles regional data, tools, and information that will be needed to implement the plan.		

<u>Environmental Outcomes</u>	<u>Measures</u>	<u>Outputs (Work Products and Activities)</u>	<u>Status / Comment</u>
Improved protection of drinking water source areas		<p><i>FY16-17 Outputs:</i></p> <ol style="list-style-type: none"> 1. Documentation of the role of the basin-wide comprehensive plan in addressing interstate water quality concerns (September 30, 2016) 2. Maintain proficiency in regional response to actual spill events (Ongoing) 3. Updated WQ data inventory contents and interactive map (September 30, 2016, September 30, 2017) 4. Impervious cover study, Phase 2 data & journal article (September 30, 2017) <p><i>FY16-17 Activities:</i></p> <ol style="list-style-type: none"> 1. Promote interest in the Potomac Basin-Wide Comprehensive Water Resources Plan Communicate with representatives from each basin state to define the role of the basin-wide comprehensive plan in addressing interstate water quality issues (e.g. how the plan complements and builds on TMDL development and implementation and state and local water quality planning efforts). 2. Exercise ICPRB spill response procedures and coordinate with utilities and government agencies 3. The Potomac River Drinking Water Source Protection Partnership (DWSPP) is composed of utilities and government agencies that have joined this partnership to discuss issues concerning safe drinking water, acquire information, and promote actions to protect source water. ICPRB provides staff support to DWSPP with funding from other sources but will use this grant for the specific purpose of supporting the maintenance of a database of water quality monitoring programs and to provide GIS based products that display water quality issues. 4. Impervious cover study, Phase 2 (Phase 1 was completed in FY2015) <ol style="list-style-type: none"> a. Conduct the analyses at the HUC12 scale, including re-classification of land uses, modeling, statistical analysis, and preparation of a journal article. b. Assess influence of urban development and impervious surface cover on streamflow metrics at the HUC12 scale. 	<ol style="list-style-type: none"> 1. Formation of comp plan advisory committee, which will serve as the forum for this discussion, is underway through another ICPRB project. 2. Identified improvements related to recent spills and continued coordination with stakeholders; staff member certification in ICS 100, 200, and 700. 3. Mapping interface improvements and inventory updates are underway. 4. Staff are working to reclassify land uses using Phase 5.3.2 model land cover/uses and applying them to HUC12s with modifications <p>Additional - staff attended meetings of the WRAC and assoc. technical subcommittee (assess groundwater availability)</p>

■ ■ ■ 3: Assistance to Potomac jurisdictions' monitoring strategies**Goal:** (2) Clean and Safe Water**Objective:** (2.2) Protect Water Quality**Program Result Code:** 202B06**Work Plan Component:** Water Quality Monitoring**EPA Contact:** Leo Essenther**ICPRB Contact:** Jim Cummins (301) 274-8106**Program Description:** ICPRB enhances the collective understanding of the Potomac River mainstem's general condition, to assist states in determining if the Potomac River is meeting its clean water goals.

<u>Environmental Outcomes</u>	<u>Measures</u>	<u>Outputs (Work Products and Activities)</u>	<u>Status / Comment</u>
Increased knowledge of key biological populations in the Potomac mainstem		<p><i>FY16-17 Outputs:</i></p> <ol style="list-style-type: none"> 1. Data and interpretive report of ICPRB 3-year (2012-2014) Potomac mainstem surveys at Little Falls, Carderock and Knoxville sites (Dec 31, 2015) 2. Report on possible biological metrics for the Potomac River mainstem and the availability of biological data needed for metric calculations (September 30, 2017) <p><i>FY16-17 Activities:</i></p> <ol style="list-style-type: none"> 1. Complete 2012-2014 interpretive report of freshwater macroinvertebrates, mussels, and SAV data collected in the Potomac mainstem at Little Falls, Carderock and Knoxville (near Harper's Ferry) sampling sites. <ul style="list-style-type: none"> ○ Results are a snapshot of existing biological communities at these sites during normal-flow years. They provide a baseline for measuring biological impacts relating to flow modifications and large water withdrawals above the Great Falls and Little Falls sections during droughts. 2. Begin development of large river biological metrics applicable to the Potomac River and its larger tributaries <ul style="list-style-type: none"> ○ Evaluate potential large river metrics for the Potomac River mainstem ○ Assemble large river dataset and explore metric options ○ Identify field sites, if needed, to collect additional data for metric development ○ Evaluate options for ICPRB to continue collecting data from under-represented locations in Potomac mainstem upstream of Knoxville 	<ol style="list-style-type: none"> 1. Report <ul style="list-style-type: none"> ○ Some report sections are completed 2. Biological metrics <ul style="list-style-type: none"> ○ Tested a suite of 59 potential stream macroinvertebrate metrics for best candidates to characterize the ecological conditions in the mainstem Potomac River ○ Met with MD Dept. Natural Resources monitoring staff to discuss large river monitoring needs and identify field sites for future sampling in the Potomac basin ○ Currently developing proposal for supplemental large river monitoring in summers of FY16-17

Goal: (2) Clean and Safe Water	Objective: (2.2) Protect Water Quality	Program Result Code: 202B06
Work Plan Component: Water Quality Assessment	EPA Contact: Leo Essenthier	ICPRB Contact: Claire Buchanan (301) 274-8112
Program Description: ICPRB disseminates the results of Commission studies to broader scientific and resource management audiences, and contributes to the base of scientifically defensible knowledge needed for effective policy and decision-making.		

<u>Environmental Outcomes</u>	<u>Measures</u>	<u>Outputs (Work Products and Activities)</u>	<u>Status / Comment</u>
Enhanced assessments of aquatic ecosystem health		<p><i>FY16-17 Outputs:</i></p> <ol style="list-style-type: none"> 1. Maps: non-tidal streams and rivers in Chesapeake Bay basin with a) inherent potential for filamentous algae growth (September 30, 2016) and b) actual excess filamentous algae growth (March 31, 2017) 2. Technical paper(s) submitted for publication in peer-reviewed journals 3. Updated and expanded technical information on ICPRB website <p><i>FY16-17 Activities:</i></p> <ol style="list-style-type: none"> 1. Develop a better understanding of the inherent potential for filamentous algae growth in regional flowing waters of the Central Appalachian, Ridge & Valley, Piedmont ecoregions <ol style="list-style-type: none"> a. Use hypotheses identified in the FY15 literature review (includes the WVDEP alkalinity/hardness hypothesis) to analyze available water quality data and map USEPA Region 3 streams and rivers with chemical conditions that potentially favor algae growth. b. Continue to obtain locational information about filamentous green algae from state agency field personnel, water suppliers, river guides, and others c. Assemble map of observed algal distribution with a goal of "testing" hypotheses against empirical information. 2. Prepare and submit manuscripts for publication in peer-reviewed journals. Publication of ICPRB's technical work provides a rigorous critique of ICPRB results, broader dissemination of the results, and a scientifically defensible base of knowledge to inform policy and decision-making. 3. Update and expand the technical section of the ICPRB website with <ol style="list-style-type: none"> a. Interactive graphics of Potomac data b. Links to scientific studies, presentations, and data analyses <p>Maps showing health of streams, rivers, and estuary</p> <p>Attachment A: Additional Detail for Task 4 Activity #1</p>	<ol style="list-style-type: none"> 1. Filamentous green algae <ul style="list-style-type: none"> o Worked with software developer to build a phone app with secure data exchange o Worked with software developer to build a GIS based spatial plotting component of volunteer data o Initiated "eyes on the river" volunteer network o Explored the use continuous monitoring technology as a surrogate for water chemistry nutrient testing o Explored new methodologies for analyzing continuous monitoring data 2. Manuscripts <ul style="list-style-type: none"> o Poster presentation at the Nov 8 - 12, 2015 meeting of the Coastal and Estuarine Research Federation in Portland OR o Preparing manuscript based on Cacapon River WV microcosm study o Preparing manuscript on an index of estuarine phytoplankton habitat 3. Website development



Goal: (2) Clean and Safe Water

Objective: (2.2) Protect Water Quality

Program Result Code: 202B06

Work Plan Component: Water Quality Assessment

EPA Contact: Leo Essenthier


ICPRB Contact: Claire Buchanan (301) 274-8112

Program Description: ICPRB will assemble and analyze long-term water quality data sets from EPA Region 3 states and determine middle- and long-term trends.

<u>Environmental Outcomes</u>	<u>Measures</u>	<u>Outputs (Work Products and Activities)</u>	<u>Status / Comment</u>
Enhanced assessments of aquatic ecosystem health		<p><i>FY16-17 Outputs:</i></p> <ol style="list-style-type: none"> 1. Water quality trends final report and associated data set (on or before Sept 30, 2017) <p><i>FY16-17 Activities:</i></p> <ol style="list-style-type: none"> 1. Determine long-term, ambient water quality trends at stations USEPA Region 3 states <ol style="list-style-type: none"> a. Obtain and review available long-term data. b. Consult with USEPA3 to confirm data to be used in trend analyses, and identify preferred trend period(s) and analysis method(s). c. Perform trend analysis d. Write report <p>Attachment B: Additional Detail for Task 5 Activity #1</p>	<p>1a. Data have been acquired and an initial review of the data quality and parameter comparability is complete; a review of trend analyses reported in the literature currently is being performed</p>

**Goal:** (2) Clean and Safe Water**Objective:** (2.2) Protect Water Quality**Program Result Code:** 202B06**Work Plan Component:** TMDL**EPA Contact:** Leo Essentier**ICPRB Contact:** Ross Mandel (301) 274-8118**Program Description:** ICPRB participates in and contributes to the development of regional TMDLs and efforts to improve the model-based tools and approaches used in TMDL development.

<u>Environmental Outcomes</u>	<u>Measures</u>	<u>Outputs (Work Products and Activities)</u>	<u>Status / Comment</u>
Improved tools for TMDL development		<p><i>FY16-17 Outputs:</i></p> <ol style="list-style-type: none"> 1. Memos documenting significant tasks performed, as requested, in support of jurisdiction TMDL, MS4, or other regulatory programs. 2. Tech memos documenting evaluation and/or adaption of computer simulation models to water quality problems in the Potomac River basin. Submitted as requested. 3. TMDL development for District of Columbia Potomac and Rock Creek watersheds: <ol style="list-style-type: none"> a. Presentations at public meetings in Fall of 2015 b. Responses to comments related to the technical aspects of the TMDL (by Spring 2016) d. Requested adjustments to draft TMDLs c. Modeling framework for Rock Creek TBD 4. Provide written or oral comments on approaches to quantifying uncertainty in Chesapeake Bay Program models. Submitted as requested. <p><i>FY16-17 Activities:</i></p> <ol style="list-style-type: none"> 1. Provide technical assistance, on request, to basin jurisdictions in addressing TMDL-related issues; provide technical review of MS4 permits or other regulatory or programmatic documentation and assistance for MS4 permit implementation, on request of basin jurisdictions. 2. Analyze computer simulation models for potential application to TMDLs and water quality problems. 3. Assist EPA and DDOE as requested in the redevelopment of toxics TMDLs in the Potomac and Rock Creek watersheds as identified in DDOE's 2014 approved IR. 4. Review methods of quantifying uncertainty in computer simulation models with an emphasis on their possible application to the Chesapeake Bay Program Watershed Model and Water Quality and Sediment Transport Model. 	<ol style="list-style-type: none"> 1. Submitted draft report on revising pesticide TMDLs for DC's Rock Creek and Potomac River tributaries; subsequently revised draft in the light of EPA and DOEE comments. 2. At the request of VADEQ, calculated <i>E. coli</i> baseline loads and load allocations for bacteria TMDLs for upper Goose Creek, Cromwell's Run, and Little River and documented methods and results in a memo to VADEQ. 3. Developed spreadsheet models of PCBs in DC Rock Creek tributaries and calculated load allocations for revised TMDLs. 4. R. Mandel attended a STAC workshop on assessing uncertainty in the Chesapeake Bay modeling system, Feb. 1-2, 2016.

		
Goal: (2) Clean and Safe Water	Objective: (2.2) Protect Water Quality	Program Result Code: 202B06
Work Plan Component: Water Quality Assessment	EPA Contact: Leo Essenthier	ICPRB Contact: Curtis Dalpra (301) 274-8107
Program Description: ICPRB improves the management and availability of Commission resources to support science-based decision-making. It disseminates information about the Potomac River through media, presentations, workshops, and partnerships with educational and watershed groups, and maintains a Potomac-focused website and library.		

<u>Environmental Outcomes</u>	<u>Measures</u>	<u>Outputs (Work Products and Activities)</u>	<u>Status / Comment</u>
A public that is more informed about and actively engaged in protecting the Potomac basin's water resources		<p><i>FY16-17 Outputs:</i></p> <ol style="list-style-type: none"> Information about Potomac River and related topics for public outreach <ol style="list-style-type: none"> Weekly <i>Potomac River Watch</i> in summer, weekly <i>Potomac News Reservoir</i>, quarterly e-newsletters, occasional press releases Commission website (www.potomacriver.org), library Educational outreach <ol style="list-style-type: none"> Online educational resources Workshops, presentations, and curricula for educators and students <p><i>FY16-17 Activities:</i></p> <ol style="list-style-type: none"> Promote public involvement and stewardship, and inform the public about Potomac basin issues, through <ol style="list-style-type: none"> Responses to information requests Active website and social media sites, online news service, press releases Potomac-focused library Presentations and workshops as requested Support for and participation in watershed-focused groups Watershed and stream education and action programs <ol style="list-style-type: none"> Develop and distribute lesson plans and inquiry-based activities Build coalitions with schools, local governments and citizen groups to initiate school-based stream 	<ol style="list-style-type: none"> Information <ul style="list-style-type: none"> Produced weekly news digest, Potomac News Reservoir, sent to more than 890 subscribers. Preparing weekly Potomac River Watch public service announcements, sent to more than 40 media outlets in the Potomac basin. Begins on Memorial day and runs to Labor Day. Responded to about 20 information requests per week, ranging from publications to in-depth research. Made three information presentations to garden clubs and watershed groups. Daily posts in Facebook and Twitter. Facebook reaches several hundred people per week. Website maintained and added to weekly. Latest additions include updates, new publications, and plans for interactive maps on water quality issues. Facebook and Twitter re integrated into website and can be accessed from site. Prepared presentation materials for other units. Reviewed reports and provided graphics for other units. Education <ul style="list-style-type: none"> Delivered Watershed Connections Lessons to three high schools in Prince George's County, MD, in preparation for a year-long stormwater reduction program – mentored 4 teachers and taught over 300 students. Met with and maintained contact with Port Tobacco Conservancy to provide support with capacity building and educational outreach. Exhibited at two regional conferences, promoting ICPRB's educational stream and sustainability programs, which satisfy the Meaningful Watershed Education Experiences (MWEEs) in the Chesapeake Bay

		<p>restoration and stormwater LID projects</p> <p>c. Stream ecology classes and mentoring for teachers and students</p> <p>d. "Watersheds Connections" Program – instruct teacher in building and using land use watershed models</p> <p>e. "Score Four for Students, Schools, Streams and the Bay" Program - teach and implement Score Four program in school districts; initiate and track restoration projects on school grounds</p>	<p>Agreement.</p> <ul style="list-style-type: none"> ○ Put teacher curriculum and land-use watershed model building instructions on ICPRB's website for our Watershed Connections Program. ○ Put all lesson plans, inquiries, and resources for Score Four for Students, Schools, Streams, and the Bay program on ICPRB's website. Have begun dissemination of these resources to educators through the internet and on-site workshops. ○ Developed ongoing collaborations with county and public organizations to support the Score Four Program in Prince Georges County, MD (the Prince Georges County (PGC) Master Gardeners, PGC Department of Environmental Protection; the William Schmidt Environmental Education Center, PGCPS; and Chesapeake Natives). ○ Co-taught Score Four lessons at three PGC schools from October 2015 through May 2016, leading students in campus science inquiries, and the planning, design, and implementation of two conservation landscapes and a food forest to reduce stormwater pollution. <ul style="list-style-type: none"> • About 330 students have participated, of which about 50 qualify for free lunches, about 29% are of Hispanic origin, and about 68% are of African-American background. ○ Represented ICPRB at meetings of the Citizen Science subcommittee of the Maryland Water Monitoring Council and the Sustainable Schools Forum, PGC DEP.
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Attachment A

Additional Detail for Task 4 Activity #1

Areas in EPA3 with enhanced susceptibility to filamentous algal growth

The primary objectives of this activity are to develop a better understanding of the possibly cause(s) of filamentous algal blooms in the Central Appalachian, Ridge & Valley, and Piedmont ecoregions of USEPA Region 3, and to identify streams and rivers with high risk of algal blooms. We will investigate the observed distribution of filamentous algal blooms and compare it to projections of algal bloom risk based on ambient water chemistry and geologic conditions. This FY2016 - 2017 project will build on work completed in the FY2015 CWA106 grant, namely: a literature review, and identification of specific hypotheses for why some rivers are more or less susceptible to filamentous algal growth (e.g., WVDEP alkalinity/hardness hypothesis). FY2016 - 2017 efforts will include the following:

FY2016 - Activities and Products

- Continue to obtain locational information about filamentous algae from state agency field staff, water suppliers (e.g. Potomac Drinking Water Source Protection Partnership), river guides, and others (effort began in FY2015)
- Create an interactive map that allows spatial analysis of observed algal bloom cover
 - algal spatial distribution (occurrence)
 - watershed /landscape features (geology, land uses)
 - instream water quality and stream habitat
 - macroinvertebrates status
 - potentially include vertebrate data
- Draft manuscript on Cacapon case study for peer-reviewed journal

FY2017 - Activities and Products

- Complete Cacapon River case study manuscript and submit to peer-reviewed journal
- Identify streams and rivers in the region that are more or less susceptible to algal growth according to literature review findings (algal bloom risk)
 - Analyze water quality data, including data obtained in ICPRB CWA106 grant Task 5 (Region 3 long-term water quality trends)
 - Develop maps indicating algal bloom risk according to the different hypotheses
- Compare algal risk maps to map of observed algal blooms
- Draft final report (submitted on or before September 30, 2017)

Attachment B

Additional Detail for Task 5 Activity #1 Long-term water quality trends in EPA3 region

Focus:

- A suite of parameters commonly measured by most or all states
- Long-term trends at monitoring stations initiated in the 1970s & early 1980s in response to the CWA of 1972 (greater than 40 year period) and maintained for most years through 2014
- In-stream concentrations, not loads
- Focused on ambient water quality conditions and parameters impacting aquatic life, and possibly human health
- All EPA3 states: Pennsylvania (PA), Delaware (DE), Maryland (MD), West Virginia (WV)¹, Virginia (VA) and the District of Columbia (DC)
- Data sources will be federal and state agencies and river basin commissions (ORSANCO, DRBC, SRBC); county and other sources if time permits
- Likely parameters are:

Aluminum	Iron	Sodium	Sulfate
Alkalinity	Fecal Coliform	Nitrate-nitrite	Tot. Diss. Solids (TDS)
Calcium	Hardness	Phosphorus (TP)	Temperature
Chloride	Potassium	Lead	Tot. Organic Carbon
Dissolved Oxygen	Magnesium	pH	Tot. Suspended Solids
%DO Saturation	Manganese	Spec. Conductance	Zinc

Analysis Steps:

1. Obtain long-term data from multiple sources, including STORET/WQX and NWIS.
2. Review data quality (minimum detection limits, data gaps, method changes, etc.). Contact data providers for data documentation or QA'ing the data.
3. Consult with USEPA3 staff to confirm a) parameters, stations, and data to be used in trend analyses, b) preferred trend period(s), and c) report structure and content. Determine if flow-correction is possible.
4. Determine appropriate trend methods; apply adapted ICPRB R-scripts to data and calculate trends.
5. Port output into standardized report tables and graphs.
6. Draft final report (submitted on or before Sept 30, 2016)

Caveats

It may not be possible to estimate trends for some constituents in some jurisdictions. A preliminary review of chloride, zinc, and fecal coliform monitoring data available from the STORET Legacy Data Center suggested that only a few observations of chloride and zinc were available from Maryland and observations of fecal coliform in Maryland were only reported in the mid-1980's. Other jurisdictions had some stations at which there were sufficient observations to estimate trends for chloride, zinc, and fecal coliform, but may be missing data for other constituents.

¹ In an earlier project, West Virginia water quality trends were calculated for the period between the 1970s and 2012. For Task 5, additional data could potentially be added to the WV data set and/or different trend periods analyzed. West Virginia results will be included in the final report.